Taking the book as a whole, the reader's interest is fully sustained, and although one finds instances of duplication of cautions, this is evidently the result of the sectional arrangement and so unavoidable.

In so excellent a work detailed criticism is a somewhat thankless task, but it might be suggested that in discussing the risks attendant on the use of petroleum lamps, some notice might be taken of the views of Sir James Dewar, Dr. Boverton Redwood, and the late Sir Frederick Abel, as to increase of the flash point not being so complete a solution of the trouble as the author leads one to believe.

It might be well to note in a future edition that barium peroxide, which on p. 117 is said to become dangerous at 800° C., may also give rise to fire at atmospheric temperatures when exposed to friction with organic matter.

On p. 187 it is stated that one pound of calcium carbide furnishes 4 to 4½ cubic feet of acetylene, which is perfectly true of the inferior carbide made on the Continent, but with material of the quality until recently made at Foyers the yield rarely fell below 5 cubic feet per pound.

Occasionally one finds slight discrepancies in the statement of temperatures in different parts of the book, the temperature at which lead fuses being given at p. 291 as 325° C., whilst in the appendix, p. 343, it is stated to be 334° C. Such details as these, however, detract but little from the value of a book which is an important and most valuable addition to the technical literature of the day.

THE DETERMINATION OF MINERALS.

Mineral Tables—for the Identification of Minerals by their Physical Properties. By Arthur S. Eakle, Ph.D. Pp. 73. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1904.) Price 5*s.* 6*d.* net.

STUDENTS of mineralogy, miners, prospectors, and others interested in the determination of minerals by methods which do not involve the use of elaborate apparatus, will find this little book a useful addition to the literature of the subject.

The tables, though forming a volume of only 73 pages, include nearly 250 minerals, comprising all the commonly occurring ores, veinstones, and rock-formers, as well as a few species of more restricted occurrence. They are designed for the identification of unknown minerals by the examination of their physical properties alone; blowpipe reactions are not employed at all in the scheme. It is claimed by the author that the determination of minerals by blowpipe analysis is less apt to become merely mechanical if it has been preceded by practice in identification by physical properties. This is no doubt true; and if, as is often the case, the beginner is tempted to rely upon blowpipe analysis alone, that intimate acquaintance with minerals which is only gained as the result of the systematic observation of their physical properties, and which is so valuable for their ready recognition in the field, is either missed entirely or is only very imperfectly acquired. Indeed, in most cases blowpipe reactions are best employed by the determinative mineralogist in confirming conclusions already arrived at from the evidence of physical properties. They are, however, so invaluable for this purpose, and afford such an indispensable aid to identification by physical properties, that any determinative scheme from which they are entirely excluded must be in a sense deficient. The author would have greatly added to the value of the tables by including for each species a brief statement of its distinctive blowpipe reactions, and we venture to suggest this extension of the scope of the work to him for future editions.

As in all tables of this kind, the identification of an unknown mineral is effected by a process of elimination. The minerals dealt with in the book are first divided into categories according to their colour in the powdered condition; these groups are then subdivided into minor groups according to the colour of the mineral in mass; and finally, the species in each of these divisions are arranged in order of hardness.

In general plan the tables are similar to those of Weisbach; but they differ from them in certain respects, notably in their greater simplicity, and in the abandonment of that indefinite and unsatisfactory property lustre, as an important means of discrimination. The tables are preceded by an "analytical key," by reference to which it is possible, after preliminary observations of streak and colour, to see at a glance in which table the mineral under examination will be found; it is then only necessary to determine the hardness and one or two other characters, such as crystalline form, structure, cleavage, specific gravity, and so forth—all of which are described in columnar form in the tables—to complete the identification.

The omission of the great majority of those rare minerals which the ordinary student or prospector is scarcely likely to meet with, and which by their insertion render so many books of this kind dear and unnecessarily complicated, is to be commended. The tables are certainly to be regarded as among the most satisfactory that have yet appeared.

OUR BOOK SHELF.

Die Sinnesorgane der Pflanzen. By G. Haberlandt. Pp. 46. (Leipzig: Barth, 1904.) Price 1 mark.

THIS little book, which is appropriately dedicated to the memory of Darwin, was given as a lecture before the recent Versammlung deutscher Naturforscher und Aertzte at Breslau. The author devotes the chief part of his space to a semi-popular account of the various types of structures, such as bristles, hairs, papillæ, which serve for the perception of mechanical stimulus. This is necessarily, to a large extent, a recapitulation of his own interesting work on the subject, and is followed by an account of the *statolith* theory—the hypothesis independently put forward by himself and Němec as explaining the sensitiveness of plants to the force of gravity. The most interesting part of the lecture is, however, Haberlandt's concise discussion of his recent theory of the mechanism by which the direction of incident light is perceived by plants. He believes that the epidermic cells are, so to speak, the eyes of the plant. Thus, according to his view, when light strikes a leaf at right angles to the surface it results, from the plano-convex form of the epidermic cells, that the inner wall of each cell is illuminated

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more brightly in the centre than at the periphery. This makes it possible for the leaf to orientate itself in regard to light. Thus, suppose the plant to be moved so that the light now strikes the leaf obliquely, the bright patches of light on the inner cell walls will no longer be central. This change may be believed to constitute a stimulus calling forth a curvature of the leaf stalk by which the leaf is brought again to its normal position at right angles to the incident light. Thus the leaf moves when the bright patch is not central, and comes to rest when each of its epidermic cells is centrally illuminated. This attractive theory cannot be said to be as yet established, and botanists will look with interest to its further development by its author. The appendix of six pages is devoted to the literature of the subject and to short discussions of points which probably seemed too technical for the text of the lecture.

Electricity in the Service of Man. By R. M. Walmsley. Pp. viii + 1208. (London: Cassell and Co., Ltd., 1904.) Price 10*s*. 6*d*. net.

WHEN the first edition of this book was published in 1888, it was doubtless a comparatively easy matter to write a treatise covering all the practical applications of electricity to the service of man. As each successive edition appeared the task must have become one of increasing difficulty, and now that the fourth has been reached Dr. Walmsley no longer finds it possible to condense all his material into one volume. He has therefore wisely confined himself to certain branches, and left the others for treatment in a supplementary volume. The book before us is divided into two parts, the first being more or less theoretical, dealing with the principles, and incidentally with the history, of the subject, and the second dealing with the technology of electricity. The first part is clearly written, and forms a good introduction to the study of electricity and magnetism which should be valuable to the beginner or to the amateur interested in scientific progress. The second part is confined in the present volume to generators and motors, with a chapter on measurements. The writer is of opinion that these more advanced subjects are best studied by means of the many very excellent treatises specially devoted to them; but still, there can be no doubt that a general review such as the one before us appeals to a large class of readers and serves a useful purpose. The book is plentifully illustrated with drawings and diagrams, which are for the most part good, though several, especially in the earlier part, are rather crude and out of date. M. S.

The Flora of the Presidency of Bombay. By T. Cooke. Vol. ii. Part i. Compositæ to Boraginaceæ. Pp. 216. (London: Taylor and Francis, 1904.) Price 9*s*.

THIS volume begins in the middle of the series *inferae* belonging to the gamopetalous division. The indigenous species of Compositæ are numerous, but for the most part are not so important as the introduced composites, of which a list is given. In the series *heteromerae* the cohort Ericales is unrepresented, but the orders Myrsineæ, Sapotaceæ, and Ebenaceæ include several interesting genera. Under Bassia Dr. Cooke explains how the synonym Illipe has been erroneously introduced. Illipe is the Tamil name for *Bassia longifolia,* and is applied commercially to the fatty product obtained from the fruit; this species replaces in southern India the better known mahua tree, *Bassia latifolia,* of which the flowers furnish a favourite food, also a spirit to the natives of Central India. The province is rich in species of Diospyros, amongst them *ebenum, melanoxylon,* the calamander-like *oocarpa,* and *crumenata.* The author agrees with Hiern in uniting *D. ebenum* and *D. assimilis,* but separates *D. cordifolia* and *D. montana.* The Apocynaceæ include *Cerbera Odollam* of the salt marshes, an endemic Beaumontia, and a species, also endemic, of Ervatamia, a genus cut off by Dr. Stapf from the original genus Tabernæmontana. Another dominant order is that of the Asclepiadaceæ, which furnishes mostly twining shrubs or climbers, and of which a good many, as, for instance, the four species of Hoya, and seven species of Ceropegia, are confined to the western side of the peninsula. This part gives every indication of the same care and accuracy which distinguished the first volume.

Quadratic Partitions. By Lieut.-Colonel Allan Cunningham, R.E. Pp. xxiv + 266. (London: F. Hodgson, 1904.) Price 12*s*. net.

THIS contains a complete list of primes p up to 99991, with the factors of $p-1$, and resolutions of

$$p=a^2+b^2=c^2+2d^2=A^2+3B^2=\tfrac{1}{4}(L^2+27M^2);$$

of $p=e^2-2f^2$ up to $p=24977$; together with other resolutions of the type $mp=x^2\pm Dy^2$ for selected values of m, D, and all primes p up to a certain limit. Besides this, there are tables relating to the Pellian equation, and others directly connected therewith. The introduction explains the nature and use of the tables, and gives an account of their preparation. Though some of the contents have already been published (as explained in the introduction), a substantial part appears for the first time in print; the whole forms a varied as well as extensive series of arithmetical records which will be found of great value by those who are interested in the theory of numbers, especially in connection with the theory of residues and of quadratic forms. Great care has been taken to ensure accuracy, and the appendix contains lists of errata detected in various preceding tables. The new part of the work represents a very large amount of labour, which is henceforth spared to those in search of material for induction, and the grants made by the Royal Society towards the expenses of computation and publication have been worthily bestowed. It may be added that the paper and type used are satisfactory; in the case of tables this is a matter of real importance. All serious students of the theory of numbers ought to procure this work, as well as Lieut.-Colonel Cunningham's "Binary Canon," for, independently of their use in solving special problems, these tables may suggest or confirm new theorems of real importance.

Advanced Hand-camera Work. By Walter Kilbey. Pp. xvii + 98. (London: Dawbarn and Ward, Ltd., 1904.) Price 1*s*. net.

IN this series of photographic books already published the present author is responsible for the popular volume on "Hand Colour Photography," which is now in its second edition. In the issue before us he deals with the higher flights of hand-camera work, more especially in connection with its use with the focal plane shutter. The subject-matter treats of the selection of apparatus, the behaviour and efficiency of the focal plane shutter, and practical work with the camera, the last mentioned consisting of hints on focusing, exposing, and the treatment of moving objects. No less important are the subjects of the last two chapters, which concern the plates and developers suitable for such work, and the employment of hand cameras in telephoto, stereoscopic, and orthochromatic photography. A great number of excellent and appropriate illustrations from the author's own negatives accompany the text.

The easy and clear style of the author, and his thorough acquaintance with the subject he is treating, render the book not only delightful to read, but a valuable guide to those who wish to work successfully with hand cameras.

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